In the Specification:

Replace the paragraphs beginning on page 3, line 8 with the following amended paragraphs:

The invention is intended to eliminate the defects in sound reproduction, particularly in public buildings. The intention is to create a loudspeaker, which will produce an extensive and even sound lobe, i.e. local sound field, with a sound pressure that varies only slightly as a function of location. A method for sound reproduction, in which a vibrating diaphragm controlled by an operating device produces sound in the air surrounding it on the first side, and in which so-called acoustic feedback is prevented by preventing the passage of the air over the edge of the diaphragm to its other side, and in which the air transports the sound to the surrounding free space, is characterized in that the diaphragm is formed as a uniformly vibrating, essentially straight and high element, so that the height H of diaphragm is at least three times, and preferably at least five times its width W, and that an essentially closed chamber is formed in front of the diaphragm, except for a ~~port~~ narrow opening arrangement, in which one or more ~~ports~~ narrow openings essentially corresponding to the height of the diaphragm permit the passage of air and thus of sound from the chamber to the free space.

The pillar loudspeaker is intended for sound reproduction indoors and outdoors. The pillar loudspeaker includes a cabinet construction supporting a diaphragm, at least one operating device for driving the diaphragm, which is operationally a straight, unified, and relatively stiff single component, which is tall vertically and narrow horizontally in such a way that the height H of diaphragm is at least three times, preferably five times greater than its width W, and in which the diaphragm is arranged to vibrate mechanically by means of the force of operating device to produce a sound in the free space. The cabinet construction is arranged to prevent acoustic feedback in such a way that the cabinet construction encloses

one side of the diaphragm, the other side has an air connection to the free space, and is characterized in that the loudspeaker includes a ~~port~~ narrow opening arrangement, comprising at least one ~~port~~ narrow opening in front of the diaphragm in the construction forming chamber and leading away from the chamber, to allow air to pass from the chamber to the free space. As such, a high diaphragm directed to an unrestricted space will not offer many advantages, but, if a ~~port~~ narrow opening arrangement according to the invention is added to this, an entirely new type of loudspeaker will be created. In principle, each point on a unified loudspeaker diaphragm is an independent and dynamic source of sound. If these diaphragm points move in phase with one another, each one of them will also, in principle, send a soundwave in phase to the surrounding space. The chamber forms a pressure chamber and the ~~port~~ narrow opening in it forms an acoustic load on the diaphragm and an effective source of sound. The sound coil of the loudspeaker compensates for the increase in the intensity of sound determined by the sum factors of the distance laws, if the listener moves closer to the loudspeaker. Correspondingly, if the listener moves farther from the loudspeaker, the sound lobe will compensate for the drop in the volume of sound, because the relative differences in distance between the different points on the loudspeaker diaphragm will diminish. The sound field of an entire auditorium can be controlled by means of the new pillar loudspeaker system. In it, each loudspeaker dominates its own vicinity, without interference from neighbouring loudspeakers, for instance. This also means that there is no need to use delays in a system constructed with the new pillar loudspeakers, ~~no matter~~ regardless of whether the sound reproduction system is used indoors or outdoors.

Replace the paragraph beginning on page 4, line 5 with the following amended paragraph:

There are several differences in principle between a pillar loudspeaker according to the invention and a traditional pillar loudspeaker, such as:

- the sound-producing diaphragm is a single and unified component, each point on which is, in principle, its own source of sound,
- the diaphragm is narrow and high, because the desired sound lobe of the loudspeaker is broad in the horizontal plane and narrow in the vertical,
- the diaphragm is controlled by a traditional or a new operating device, in which there may be one or more operating device units, such as magnetic voice coils or other units,
- the loudspeaker cabinet can be of any desired design and the loudspeakers can be made to suit the room,
- the active components of the loudspeaker are assembled in a separate module,
- there can be different loudspeaker modules for different purposes,
- the modules can be used either facing the wall or facing the listeners,
- the loudspeaker or module is preferably equipped with an acoustic load, either with or without the ~~port~~ narrow opening arrangement referred to later,
- the acoustic load also acts as a protection, lobe director, design factor, etc.,
- the module can be installed in a recess in a wall, in which case the wall can act as an auxiliary space,
- the pillar loudspeaker can be located acoustically correctly at listener level and without disturbing the listeners,
- a reproduction system built around the pillar loudspeaker can easily be adapted,
- pillar loudspeakers will withstand being handled by an audience without being damaged,
- the acoustic energy of a pillar loudspeaker is mainly concentrated only at listener level,
- a sound reproduction system implemented using pillar loudspeakers does not require delay lines.

Replace the paragraph beginning on page 5, line 8 with the following amended paragraph:

The most important ~~different~~ difference between a traditional pillar loudspeaker and one according to the invention is that the latter has only a single sound-producing ~~port~~ narrow opening, which is high vertically and narrow horizontally. The height of the diaphragm is generally many times its width. Practicality will set the upper limit. It is possible to imagine a diaphragm as much as 5 m high and 50 mm wide. The diaphragm is controlled by an operating device, which usually comprises one or more magnetic voice coils or other operating device units. The operating device always controls the entire active surface of the diaphragm in phase, so that it does not create lobe folds in the sound field in the same way as a multi-element traditional loudspeaker. In the same way, there are no great discontinuities in the acoustic impedance as a function of frequency.

Replace the paragraph beginning on page 5, line 23 with the following amended paragraph:

The second significant difference to a traditional pillar loudspeaker is that the dynamic components of the loudspeaker are assembled in a module, which can be installed in a cabinet of a desired design, which can be suspended, e.g., from a wall, or set directly into, e.g., an opening in a wall, or behind it. This method gives freedom of design, implementation, and location in sound reproduction solutions and accelerates them. An advantage in the loudspeaker module being manufactured as a separate module is that it can be quickly attached to another ready-made construction. In certain embodiments, the chamber and the ~~port~~ narrow opening are only formed when the loudspeaker is installed in a wall. Thus, there can then be various standard products, into which the module will fit. The production process is simplified and the need to transport components is reduced.

Replace the paragraph beginning on page 6, line 1 with the following amended paragraph:

The third significant difference to a traditional pillar loudspeaker is that a loudspeaker according to the invention is usually installed on a wall with the loudspeaker diaphragm facing the wall, in other words, the diaphragm is between the cabinet and the wall. In this case, the ~~port~~ narrow opening between the wall and the cabinet creates an acoustic load on the loudspeaker. Usually, this ~~port~~ narrow opening is so small, that fingers cannot penetrate it. When installed in this way, the loudspeaker will withstand being handled from the listener side, because the more fragile diaphragm is protected. The loudspeaker can be located acoustically correctly, sufficiently low down and close to the listeners, who are preferably situated in the direct sound lobe and field. When only a module is used, it can be installed directly in a recess in a wall, either with or without the aid of an acoustic load. The loudspeaker diaphragm of the new loudspeaker is a rather thin, stiff plate or moulded shape, which produces a broad-lobed sound in the horizontal plane and a narrow-lobed sound in the vertical plane. The loudspeaker is intended for the entire range of sound, but its reproduction range depends on the embodiment. The loudspeaker diaphragm will withstand normal handling, installation, and use. Modifications to the loudspeaker diaphragm will achieve desired objectives, such as evenness of the reproduction curve, variations in sensitivity, damping, protection, design requirements, etc. The loudspeaker diaphragm is suspended in a separate body unit or module, which is, in turn, installed either in a cabinet or directly in a wall. A loudspeaker with a cabinet is usually installed as a surface installation on a wall, so that the module and diaphragm face the wall. In such cases, the opposite side of the loudspeaker cabinet forms a facade facing the audience, and can be designed to suit the room in which it is wished to install it.

Replace the paragraph beginning on page 7, line 13 with the following amended paragraph:

Figure 2a) shows an example of a loudspeaker module installed in a wall cavity with its facade plate removed,

b) shows a cross-section A-A on the centre-line of the previous installation,

c) shows one third example, in which there is an open acoustic load (~~port~~ narrow opening) in the centre of the loudspeaker module,

Replace the paragraph beginning on page 11, line 33 with the following amended paragraph:

Figure 1d shows an enlarged cross-section B - B of pillar loudspeaker 1 at magnetic voice coil 24, when the loudspeaker is suspended from wall 28 by means of suspension piece 16. Though in this case the surface of cabinet 1 is set parallel to the surface of the wall, the adaptation of the suspension devices will permit its ~~be~~ installation at an angle to the wall, leaving a ~~port~~ narrow opening only at one edge, with the other edge closed.

Replace the paragraph beginning on page 12, line 6 with the following amended paragraph:

Magnetic voice coil 24 is one part of operating device 21, which moves diaphragm 13. Voice coil 24 is connected to the diaphragm either directly or else by means of an intermediate component, i.e. a diaphragm seat. Magnet 23 is suspended in module body 11 by means of a magnet bridge 25, which also centres the ~~port~~ narrow opening of magnet 23 of voice coil 24. Diaphragm 13 is suspended in module body 11 from its edges by means of flexible seals 14. An enclosure 9 is formed between the wall surface 28 and cabinet 1 at diaphragm 13, from which the sound lobe discharges to the environment from the ~~ports~~ narrow openings 27 between the loudspeaker and the wall surface. These ~~ports~~ narrow openings 27 form an important ~~port~~ narrow opening system 5 from the point of

view of the operation of the loudspeaker. If an asymmetrical sound lobe is desired, the sound lobe can be oriented by blocking one of the ~~ports~~ narrow openings 27 in a controlled manner, in which case the sound will only be discharged through the other ~~port~~ narrow opening, as in an angled installation. Thus, the sound lobe can be directed, even after the installation of the loudspeakers. The direction is also influenced by factors such as the bevelling (radius 5 - 30 mm) of the rear edges 6 of the sides of the cabinet, which also affect the local lobe diffractions in the upper treble range. Because a loudspeaker diaphragm 13 installed in this way is in a small space between the side ~~ports~~ narrow openings 27, diaphragm 13 is connected to the surroundings by means of a short transfer line. The air velocity in it increases, especially at low frequencies, due to the effect of the diaphragm movement. Chamber 9 and ~~port~~ narrow opening 27 create a slight horn effect. The width d of ~~port~~ narrow opening 27 is 12 - 30 %, preferably about 20 %, of the width W of diaphragm 13. The greatest depth of the chamber is of the same order.

Replace the paragraph beginning on page 13, line 31 with the following amended paragraph:

Figure 2a shows an embodiment of a loudspeaker according to the invention, in which the 'design' cabinet is replaced by, e.g., a wall as the place of installation of the loudspeaker module 10. Module 10 is sealed into, e.g., wall opening 40 or behind it, with diaphragm 13 outwards, so that the loudspeaker construction is closed. The volume of the loudspeaker then becomes part of the wall, because the diaphragm ~~port~~ narrow opening in module body 11 permits a flow of air behind diaphragm 13 into the wall structure, in which case, e.g., the low-frequency sensitivity increases. In such a case, the acoustic load to be set in front of diaphragm 13, i.e. the protector and facade board 42, also acts as a lobe director and, along with the diaphragm dimensions and the amplitude of movement, affects the sound reproduction characteristics of the loudspeaker.

Replace the paragraph beginning on page 14, line 10 with the following amended paragraph:

Figure 2b shows a cross-section along the centre-line of a module installed in the above wall opening 40. In the backing space, i.e. in wall construction 47, there are generally damping materials, which affect the sound reproduction characteristics of the loudspeaker. In the figure, the module is installed in front, on top of the opening in the wall board. Figure 2d shows a cross-section of the installation. The figure does not show the bevelling of the edges of ~~port~~ narrow opening 27, which are only of significance at high frequencies.

Replace the paragraph beginning on page 14, line 20 with the following amended paragraph:

Module 10 can also be sunk into the opening. If the installation has been carried out behind the board, for example, when the boarding has been installed, the acoustic load can be at the level of the wall board, so that the loudspeaker can hardly be distinguished from the wall. This is particularly the case, if the acoustic load is a board with a ~~port~~ narrow opening, as shown in Figure 2c, for instance, sturdy anodized aluminium strip. Figure 2c shows a preferred embodiment of loudspeaker 1. In Figure 2c, there is a desired acoustic design load, which is in the wall opening on top of the loudspeaker module. In front of loudspeaker diaphragm 13 is a narrow ~~port~~ opening 45, i.e. a board piece equipped with an acoustic load opening 45, a facade board 42, which can also be its installation board, panel, etc. Together with diaphragm 13 and the module seal, this forms a nearly closed space (except for ~~port~~ narrow opening 45). Body 11 is closed, so that the operation of the loudspeaker is the same as in the previous case. As a result of load 42, the acoustic impedance of diaphragm 13 increases, when diaphragm 13 is dynamically pressurized. Thus, when the loudspeaker operates, air flows from its ~~port~~ narrow opening 45, particularly at low frequencies depending on the volume, when the velocity of the air

increases and the efficiency of the loudspeaker also increases. This creates an advantage, in that a small loudspeaker construction can produce powerful low reproduction frequencies. In addition, the loudspeaker directs the sound, according on its dimensions. The construction of the pillar loudspeaker may include other acoustic elements and guides, which affect the frequency reproduction and tuning.

Replace the paragraph beginning on page 15, line 18 with the following amended paragraph:

In Figures 4a and 4b, the pillar loudspeaker is installed on a pole. The independent cabinet 10 forms a ~~port~~ narrow opening 27 with the side of the pole. Correspondingly, in Figures 4c and 4d, the pillar loudspeaker is installed inside the pole. Facade board 42 forms a ~~port~~ narrow opening 27 with the side of the pole 16.

Replace the paragraph beginning on page 16, line 4 with the following amended paragraph:

Figure 3b shows linear operating device 50 seen from in front. It shows magnet body 52, magnet connecting strap 54, on either side of which are glued suitable neodym magnets 53. The voice coil 55 is set around magnet connecting strap 54 in ~~port~~ narrow opening 57 and is centred so that it does not make contact with the magnet arrangement.

Replace the paragraph beginning on page 16, line 22 with the following amended paragraph:

The following points can be made in connection with the linear operating device:

- Vortices arise in the ~~port~~ narrow opening of a moving conducting metal magnet, and tend to resist the movement of the voice coil when it is producing sound (especially when it is connected to the diaphragm).

- There are several good and appropriate materials for making the body of the voice coil, such as capton, aluminium, traditional pressboard, cardboard or paper, and suitable plastics.

- Vortices can be prevented by the following means:
  - the body of the voice coil can be made from non-conducting materials, such as capton, ceramics, plastics, composite materials, carbon-fibre (with the fibre arranged to be non-conducting), kevlar, etc..
  - if the body is made from a conducting material, e.g., aluminium, it can be made thin, in which case the effect of the vortex diminishes, or by making saw or file cuts in the body, which prevent the current circuits of the ~~electromotor~~ electromotive forces arising at the air connecting ~~port~~ narrow opening in the body from closing outside the air connecting ~~port~~ narrow opening.
  - if the body is made from a conducting material, such as aluminium (a good thermal conductor), in addition to the above, the body can be constructed using a laminating technique, so that long flow loops do not arise.
  - the body of the voice coil can be ended before the air connecting ~~port~~ narrow opening, so that the voice coil that is actually in the air connecting ~~port~~ narrow opening is glued (e.g., with ceramic material) to the body, so that the potentials referred to do not arise.

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